

### Amendments to the Claims

Claim 1 (**Currently Amended**) A sensor unit ~~mounted~~ for mounting on a mobile unit, the sensor unit comprising:

an antenna section including at least an antenna element for receiving a high-frequency signal from an external positioning system;

a sensor section including at least a gyro sensor for detecting an angular velocity of the mobile unit and an acceleration sensor for detecting an acceleration of the mobile unit;

a combining circuit including at least a first signal line through which the high-frequency signal output from ~~the~~ said antenna section is sent, a second signal line through which a signal output from ~~the~~ said sensor section is sent, and a node, which is a connecting point of ~~the~~ said first signal line and ~~the~~ said second signal line; and

a casing ~~for~~ accommodating ~~the~~ said antenna section, ~~the~~ said sensor section, and ~~the~~ said combining circuit.

Claim 2 (**Currently Amended**) The sensor unit according to claim 1, wherein

at ~~the~~ said node, the sensor unit combines at least the high-frequency signal output from ~~the~~ said antenna section and the signal output from ~~the~~ said sensor section, and generates a composite signal.

Claim 3 (**Currently Amended**) The sensor unit according to claim 1, wherein

~~the~~ said sensor section further includes:

an A/D converter for converting at least the angular velocity detected by ~~the~~ said gyro sensor to digital angular velocity data and the acceleration detected by ~~the~~ said acceleration sensor to digital acceleration data, ~~respectively~~;

a processor for generating a data unit including at least the digital angular velocity data and the digital acceleration data obtained through conversion by ~~the~~ said A/D converter; and

a digital modulator for digitally modulating an input carrier with the data unit generated by ~~the~~ said processor and generating a digital modulated signal, and

at the said node, the sensor unit combines at least the high-frequency signal output from the said antenna section ~~and with~~ the digital modulated signal generated by the said digital modulator, and generates a composite signal.

Claim 4 (**Currently Amended**) The sensor unit according to claim 3, wherein a frequency of the input carrier is lower than a lower limit of an occupied frequency bandwidth of the high-frequency signal.

Claim 5 (**Currently Amended**) The sensor unit according to claim 4, wherein the high-frequency signal is sent from the GPS (Global Positioning System) as the positioning system, and has a center frequency of 1.575 GHz, and said digital modulator generates the digital modulated signal ~~is generated~~ by digitally modulating an amplitude of a the input carrier having a frequency of 500 kHz with the data unit.

Claim 6 (**Currently Amended**) The sensor unit according to claim 3, wherein ~~the~~said sensor section further includes:  
a barometric pressure sensor for detecting a barometric pressure in ~~the~~a vicinity of the mobile unit; and  
a temperature sensor for detecting a temperature in ~~the~~a vicinity of the temperature sensor, and  
~~the~~said A/D converter further converts the barometric pressure detected by ~~the~~said barometric pressure sensor to digital barometric pressure data and the temperature detected by ~~the~~said temperature sensor ~~to digital barometric pressure data and digital temperature data, respectively, and~~  
said processor generates the data unit ~~generated by the processor to~~ further ~~includes~~ include the digital barometric pressure data and the digital temperature data converted by ~~the~~said A/D converter.

Claim 7 (**Currently Amended**) The sensor unit according to claim 3, wherein

~~the~~said combining circuit further includes:

a high-pass filter, placed between ~~the~~ said antenna section and ~~the~~ said first signal line, for passing a signal having a frequency equal to or higher than a lower limit of a frequency bandwidth occupied by the high-frequency signal;

a band-pass filter, connected to ~~the~~ said digital modulator, for passing a signal having a frequency bandwidth occupied by the digital modulated signal; and

a band elimination filter, placed between ~~the~~ said second signal line and ~~the~~ said band-pass filter, for passing a signal having a frequency outside the frequency bandwidth occupied by the high-frequency signal.

Claim 8 (**Currently Amended**) The sensor unit according to claim 1, further comprising:

a substrate having ~~placed thereon~~ at least ~~the~~ said sensor section and ~~the~~ said combining circuit ~~and located thereon~~, said substrate being accommodated in ~~the~~ said casing; and

an accommodation box accommodating at least one of an entirety or part of the said sensor section and/or the said combining circuit, said accommodation box having an upper surface tilted with respect to a bottom surface of ~~the~~ said casing, and being formed on ~~the~~ said substrate, wherein

at least ~~the~~ said antenna element is ~~placed~~ located on ~~the~~ said upper surface of ~~the~~ said accommodation box.

Claim 9 (**Currently Amended**) A locating unit ~~connected~~ for connecting to a sensor unit and ~~mounted~~ mounting on a mobile unit, wherein

the sensor unit sends a composite signal obtained by combining a high-frequency signal transmitted from an external positioning system and a digital modulated signal obtained by modulating a carrier with a data unit including at least angular velocity data indicative of an angular velocity of the mobile unit in a digital format and acceleration data indicative of an acceleration of the mobile unit in a digital format,

the locating unit comprising:

a dividing circuit for dividing, in response to reception of the composite signal sent from the sensor unit, the received composite signal into the high-frequency signal and the digital modulated signal;

a receiver for performing, in response to reception of the high-frequency signal obtained through division by said ~~the~~ dividing circuit, a predetermined process on the ~~received~~ high-frequency signal and calculating a current position of the mobile unit;

a digital demodulator for demodulating the digital modulated signal obtained through division by ~~the~~ said dividing circuit and reproducing the data unit; and

a processor for deriving an azimuth angle and a travel distance of the mobile unit from the angular velocity data and the acceleration data included in the data unit reproduced by ~~the~~ said digital demodulator and calculating a current position of the mobile unit by using the ~~derived~~ azimuth angle and the travel distance.

**Claim 10 (Currently Amended)** The locating unit according to claim 9, wherein

the data unit further includes barometric pressure data indicative of a barometric pressure in a vicinity of the mobile unit in a digital format and temperature data indicative of a temperature in a vicinity of the mobile unit in a digital format, ~~respectively~~; and

~~the~~ said processor

derives a change in altitude of the mobile unit based on the barometric pressure data included in the data unit reproduced by ~~the~~ said digital demodulator, and calculates the current position of the mobile unit by further using the ~~derived~~ change in altitude, and

derives the temperature in the vicinity of the mobile unit from the temperature data included in the data unit reproduced by ~~the~~ said digital demodulator.

**Claim 11 (Currently Amended)** The locating unit according to claim 10, wherein

~~the~~ said processor further corrects the ~~derived~~ azimuth angle, the travel distance, and the change in altitude by using the ~~derived~~ temperature.

Claim 12 **(New)** A sensor unit for mounting on a mobile unit, the sensor unit comprising:

an antenna section including at least an antenna element for receiving a high-frequency signal from an external positioning system;

a sensor section including at least a gyro sensor for detecting an angular velocity of the mobile unit and an acceleration sensor for detecting an acceleration of the mobile unit;

a combining circuit including at least a first signal line through which the high-frequency signal output from said antenna section is sent, a second signal line through which a signal output from said sensor section is sent, and a node, which is a connecting point of said first signal line and said second signal line; and

a casing accommodating said antenna section, said sensor section, and said combining circuit, wherein

said combining circuit adds, at said node, the high-frequency signal output from said antenna section with the signal output from said sensor section.

Claim 13 **(New)** The sensor unit according to claim 12, wherein

at said node, the sensor unit combines at least the high-frequency signal output from said antenna section with the signal output from the sensor section, and generates a composite signal.

Claim 14 **(New)** The sensor unit according to claim 12, wherein

said sensor section further includes:

an A/D converter for converting at least the angular velocity detected by said gyro sensor to digital angular velocity data and the acceleration detected by said acceleration sensor to digital acceleration data;

a processor for generating a data unit including at least the digital angular velocity data and the digital acceleration data obtained through conversion by said A/D converter; and

a digital modulator for digitally modulating an input carrier with the data unit generated by said processor and generating a digital modulated signal, and

at said node, the sensor unit combines at least the high-frequency signal output from said antenna section with the digital modulated signal generated by said digital modulator, and generates a composite signal.

Claim 15 **(New)** The sensor unit according to claim 14, wherein  
a frequency of the input carrier is lower than a lower limit of an occupied frequency  
bandwidth of the high-frequency signal.

Claim 16 **(New)** The sensor unit according to claim 15, wherein  
the high-frequency signal is sent from the GPS (Global Positioning System) as the  
positioning system, and has a center frequency of 1.575 GHz, and  
said digital modulator generates the digital modulated signal by digitally modulating an  
amplitude of the input carrier having a frequency of 500 kHz with the data unit.

Claim 17 **(New)** The sensor unit according to claim 14, wherein  
said sensor section further includes:  
a barometric pressure sensor for detecting a barometric pressure in a vicinity of  
the mobile unit; and  
a temperature sensor for detecting a temperature in a vicinity of the temperature  
sensor, and  
said A/D converter further converts the barometric pressure detected by said barometric  
pressure sensor to digital barometric pressure data and the temperature detected by said  
temperature sensor to digital temperature data, and  
said processor generates the data unit to further include the digital barometric pressure  
data and the digital temperature data converted by said A/D converter.

Claim 18 **(New)** The sensor unit according to claim 14, wherein  
said combining circuit further includes:  
a high-pass filter, placed between said antenna section and said first signal line,  
for passing a signal having a frequency equal to or higher than a lower limit of a frequency  
bandwidth occupied by the high-frequency signal;  
a band-pass filter, connected to said digital modulator, for passing a signal having  
a frequency bandwidth occupied by the digital modulated signal; and

a band elimination filter, placed between said second signal line and said band-pass filter, for passing a signal having a frequency outside the frequency bandwidth occupied by the high-frequency signal.

Claim 19 **(New)** The sensor unit according to claim 12, further comprising:

a substrate having at least said sensor section and said combining circuit located thereon, said substrate being accommodated in said casing; and

an accommodation box accommodating at least one of an entirety or part of said sensor section and said combining circuit, said accommodation box having an upper surface tilted with respect to a bottom surface of said casing, and being formed on said substrate, wherein

at least said antenna element is located on said upper surface of said accommodation box.